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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,904	01/15/2002	Harald Rose		6117

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EXAMINER

JOHNSTON, PHILLIP A

ART UNIT PAPER NUMBER

2881

DATE MAILED: 07/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/018,904

Applicant(s)

ROSE ET AL.

Examiner

Phillip A Johnston

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 10-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☒ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

Detailed Action

Claims Rejection – 35 U.S.C. 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,184,975 to Henstra, in view of Richardson, U.S. Patent No. 4,912,405.

Henstra (975) discloses in FIG. 2 a corrector as known from the cited article by Archard, the first correction element 34 has a positive diffraction effect in the y-z plane and is neutral in the x-z plane; the effect of this element can thus be considered to be that of a cylinder lens. The second correction element 40 then has a positive diffractive effect in the x-z plane and is neutral in the y-z plane; this element can thus also be considered to be a cylinder lens, which thus extends perpendicularly to the former cylinder lens. The quadrupoles 32 and 36 in this known corrector are integrated in the correction element 34 and the quadrupoles 38 and 42 are integrated in the

correction element 40; this does not make a significant difference in respect of the behavior of this corrector. For such a corrector the course of the electron rays therein can be determined by means of computer simulation. See Column 15, line 41-55.

Henstra (975) also discloses in FIG. 4 the shape of an electrode as it is used in combination with a number of further electrodes so as to form a correction element according to the invention. A correction element thus constructed will be described in detail hereinafter with reference to FIG. 5. The electrode as shown in FIG. 4 consists of four plate-shaped conductors (poles) 60-a, 60-b, 60-c and 60-d which are electrically insulated from one another and are arranged in one flat plane so as to be symmetrically grouped around the optical axis 4 which extends perpendicularly to the plane of drawing in this Figure. This Figure also shows the mutually perpendicular x and y directions. The boundary line of these poles, facing the optical axis, is shaped as a hyperbola, which is arranged around an imaginary central circle, which is tangent to the hyperbolas. For simplicity of manufacture, the shape of a hyperbola can be approximated in known manner by means of an arc of circle. Each of the poles 60-a to 60-d can be adjusted to a potential V_1 , V_2 , V_3 and V_4 , respectively. In the simplest case, V_1 and V_3 are equal, like V_2 and V_4 , which in that case oppose V_1 and V_3 . However, it is alternatively possible to add one fixed amount to all of said potentials, without the quadrupole effect being lost. This fixed amount may have a different value for a next electrode of the correction element, so that an electrostatic monopole, i.e. an element having a lens effect, is superposed on the quadrupole. The configuration of

poles shown in FIG. 4 constitutes only one possibility for realizing the desired quadrupole effect. It is alternatively possible to use a larger number of poles (for example, 12) in known manner, the boundary line facing the optical axis then being short and linear, said linear pieces being symmetrically arranged (with a given clearance) on a circle around the axis. Each of these poles can then be excited in such a manner that a quadrupole field is suitably approximated, but superposed higher-order fields can also be formed thereon. The shape of the quadrupole is not relevant to the idea of the invention in its broadest sense. See Column 17, line 62-67; and Column 18, line 1-30.

In addition the use of comb-shaped electrodes is well known in the art, as recited in Claims 15, and 16. See for example U. S. Patent No.'s 5,719,623, and 5,838,011.

Henstra (975) as applied above does not disclose the use of magnetic deflectors to produce an emerging particle stream traveling parallel the incident electron beam, as recited in Claims 19-21. However, Richardson (973) discloses that the minimum chromatic aberration is obtained when two conditions are met. First, the electron beam passes through the collimating magnetic lens with the axis of the electron beam being coincident with the axis of the collimating magnetic lens. Second, the electron beam is focused to a point on the axis of the collimating magnetic lens. The collimating magnetic lens shown in FIG. 5(a) satisfies only the second of these conditions. To satisfy the first condition, the axis of the electron beam must be shifted with the axis of the magnetic lens so that the two remain coincident when the magnetic

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lens axis is shifted. This may be accomplished by introducing two sets of deflection coils ahead of the magnetic lens as shown in FIG. 7.

Referring to FIG. 7, the electron beam 110 which is traveling along the electron beam column axis 111 passes through beam translation deflection coils 112 and 114 which shift the electron beam axis to position 115. Position 115 is chosen to coincide with the axis 117 of the collimating magnetic lens 116, which has been shifted by a distance X from the electron beam column axis 111. As a result of the operation of coils 112 and 114, the electron beam enters the collimating magnetic lens 116 on the axis 117 of said collimating magnetic lens and is then focused to a desired point 118 which also lies on the axis of the collimating magnetic lens 116. Point 118 also lies on the surface of a specimen 119. The above assumes that the beam translation deflection coils 112 and 114 are capable of making the required deflections without introducing chromatic aberration of their own. That is, they should not deflect electrons of different energies through different distances. In general, it is not possible to prevent the introduction of at least some chromatic aberration. However, the chromatic aberration introduced by the beam translation deflection coils in question may be substantially reduced by placing said deflection coils in the bore of the collimating magnetic lens. The beam translation deflection coils are placed in the region of uniform magnetic field. In addition, the intensity of the uniform magnetic field is increased as explained below. Such a collimating magnetic lens is shown in FIG. 8. See Column 10, line 2-44.

Therefore it would have been obvious to one of ordinary skill in the art quadrupole correction device of Henstra (975) can be modified to use the deflection system of Richardson (405) to provide a parallel electron beam incident upon the correction device, so that the quadrupole fields of the corrector could more accurately produce an exit beam incident upon a specimen with practically no chromatic magnification error.

Conclusion

3. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (703) 305-7022. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (703) 308-4116. The fax phone numbers are (703) 872-9318 for regular response activity, and (703) 872-9319 for after-final responses. In addition the customer service fax number is (703) 872- 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

PJ

June 23, 2003


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
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